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'Movements that are drawn': A history of environmental animation from *The Lorax* to *FernGully* to *Avatar*

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Abstract

This article surveys the history of environmental animation and charts the aesthetic possibilities it offers for environmental representation, in order to prompt a reconsideration of indexical media's dominant role in environmental communication. Given animation's formal capabilities, it has the potential to depict imperceptible, indeterminate and interactive environments. Distinct representational practices have emerged in animated environmental films: the visualization of environmental mutability, the representation of environmental interaction and the revelation of the environment as a construct. This article defines three periods of environmental animation: the 1960s to early 1970s, the late 1980s to early 1990s, and 2005 to the present, and analyses how these practices transformed during each cycle. Early short films pioneered the depiction of a mutable environment. In the second period, mutability became less significant, but feature films expanded the possible modes of environmental interaction. Most recently, films have begun to reflect on the environment as a visual construct.

Keywords

animation, digital environments, environmental aesthetics, environmental interaction, environmental media, media studies

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Introduction

> Animation is not the art of drawings that move, but the art of movements that are drawn; What happens between each frame is much more important than what exists on each frame; Animation is therefore the art of manipulating the invisible interstices that lie between the frames. (Norman McLaren, cited in Furniss, 2007: 5)

As digital technologies become more accessible and user-friendly, animation, traditionally one of the most labor- and resource-intensive media practices, has become a widespread mode of environmental representation. Environmental animation has expanded from film and television to scientific visualizations of data, to outreach efforts of environmental organizations, and to amateur video distributed on Web 2.0 platforms. Its emerging significance in the landscape of environmental communication can be traced not only to improvements in technology, but also to animation's strengths as an aesthetic and cultural practice. It has historically facilitated communication across linguistic and generational gaps, represented phenomena not easily captured via photographic means, and specialized in the creation of indeterminate and mutable environments. These attributes offer unique affordances for the representation of current global environmental problems, such as climate change and the depletion of global fisheries, which span national and cultural contexts, are negotiated at local and global scales, and require a reimagining of environmental movements. Animation, for its accessibility, translatability and visualization of imperceptible processes, is increasingly drawn upon in the articulation of these issues.

The possibilities of animation as a mode of environmental communication have yet to be addressed in the study of environmental media, a field biased toward news and documentary. Existing discussions are limited and often criticize animation for its simplification of complex messages and transmission of ideology instead of science (Grundy, 1994; King, 1994; Muir, 1993). When environmental animation is discussed favorably, the features highlighted are often linked to non-medium-specific strategies such as the use of sentimentality rather than to animated form (Ingram, 2000; Todd, 2002; Whitley, 2008). This article attempts to dislocate environmental animation from comparisons with factual or indexical media and instead to offer a conceptualization grounded in animation's unique formal properties and history.

Environmental animation is defined here as a genre of environmental media that uses animated form (and its *strengths* of abstraction and simplification) to deliberately construct knowledge about the social and ecological processes that affect us and/or the characters and therefore assist in the creation of environmental subjectivities. While many animated films have implicit ecological themes, environmental animation explicitly points our attention to the environment as a subject, typically one that needs to be saved, and references environmentalist messages circulating in the public sphere.[1] Drawing from work in animation studies, this article suggests that animation's ability to expose us to imperceptible environments and environmental processes makes possible at least three distinct representational practices: the visualization of *environmental mutability*, the representation of environmental *interaction* and the revelation of the environment as a *construct*.

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These practices have shifted historically over three cycles of English-language environmental animation. A first wave of films surfaced during the late 1960s and early 1970s and pioneered innovative strategies for the depiction of environmental mutability. Films including *The Bear That Wasn't* (1967), *What on Earth*! (1967) and *The Lorax* (1972) portray environmental transformation, typically an unseen process unfolding over long periods of time, as a dynamic visual phenomenon. The physical environment is made kinetic and malleable – an interactive world engaged and constructed by its subjects, producers and viewers. The narratives of these films, however, often center on an unconditional critique of technological progress. The second wave of environmental animation appeared from the late 1980s to early 1990s, culminating in a cycle of innovative feature films brought about by the intersection of transnational activism, corporate environmentalism and technologies that accelerated and globalized the production process. *FernGully: The Last Rainforest* (1992), *The Rescuers Down Under* (1990) and *Once Upon a Forest* (1993), along with television shows such as *Captain Planet and the Planeteers* (1990–3), broke from the binary narrative structure of first wave films and reflect the global environment from which they arise: they model character trajectories on transnational and inter-racial interactions and incorporate technologies as part of the solution for environmental conflict. These films depict the environment as bound up and negotiated by multiple social and political processes, yet build on the strengths of earlier environmental animation in representing it as an elastic, potentially interactive space.

A pivotal moment in this history is the 1992 release of *FernGully: The Last Rainforest*. On Earth Day, *FernGully*, an animated film about the fight of rainforest fairies against logging and an evil toxic spirit, was the first feature film ever screened at the United Nations General Assembly Hall and gained a 'central place in the iconography of global, mainstream environmentalism' (Ingram, 2000: 191). Two months later, the film was shown during the groundbreaking UN Earth Summit in Rio de Janeiro. It was written up in select policy reports as recommended viewing and was adopted as the 'FernGully' allegory in some anthropology texts (Brosius, 1999). Distributed internationally by 20th Century Fox and dubbed in at least 10 languages, it was an economic success by the standards of independent animation, grossing over US$65 million dollars. As the first animated feature film to attract attention from both the public and policy-makers on an environmental issue, *FernGully* participated in the negotiations of the early 1990s, playing a brief, though important, role in mediating political discussion. The success of *FernGully* marks a point when the creative potential of animated environmental interaction was productively reconciled with the demand for correspondence and relevance to real environmental situations. The film's embrace across political spheres testifies to a moment of possibility where animation might have been sustained as a legitimate, even dominant, mode of environmental representation.

Rather than taking animation seriously, however, popular discussions of environmental animation after this cycle continued to focus on the simplifications of these films' overt environmental messages and their failure to map paths for behavioral change. When a third wave of environmental animation surfaced around 2006, less discussion was devoted to their potential for stimulating environmental change and they failed to attract the attention of policy-makers. These films, including *Ice Age: The Meltdown* (2006), *Happy Feet* (2006), *Over the Hedge* (2006) and *The Simpsons Movie* (2007),

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portray both environmental mutability and interaction, though far less frequently. There is, however, an increasing reflection on the role of the image itself in constructing the environment. It was not until the release of *Avatar* (2009), whose CGI environment is represented as a dense network both characters and audiences are invited to interact with, that another film came to both parallel *FernGully*'s success and orient itself around the construction of an interactive environment.

Compared to news coverage, the nature film and the environmental documentary, environmental animation from *The Lorax* to *FernGully* to *Avatar* has appeared to simplify and abstract critical environmental issues into allegorical tales. To dismiss the value of these films on the base of their narrative structure alone is to miss what is most compelling about them: the environments that they depict. In defining environmental animation as a historical practice and identifying its dominant aesthetic strategies, this article argues that the potential of these texts for both viewers and filmmakers lies in their creation of imperceptible and imagined worlds. Environmental animation should not be considered secondary to indexical forms, but instead as providing views difficult to achieve with indexical mediation. Examining this history both provides a context in which to evaluate the growing landscape of environmental animation, and suggests that the environmental knowledge animation has produced – its visualization of the environment as mutable, as interactive and as constructed – might be critical to imagining alternative environmental futures.

Animation and environmental media

Studies of environmental media in communication and in film studies have tended to marginalize animation in favor of factual, indexical and documentary representation. Research in environmental communication has focused on the news media and its relationship to the public sphere (Anderson, 1997; Hansen, 1993; Smith, 2000). Television news coverage is one of the most extensively treated visual media forms (Brothers et al., 1991; Cottle, 1993; Linne, 1993; Shanahan, 1993). When films are taken into consideration, the focus remains almost exclusively on documentary texts (Mellor, 2009; Monani, 2008; Opel, 2007; Schutten, 2008). In the field of environmental film studies, there has been a concentration on the nature film and the environmental documentary (Armbruster, 1998; Bouse, 2000; Mitman, 1999; Vivanco, 2002, 2004). In the study of environmental media, there is a clear bias towards the examination of news and documentary as the more serious forms of environmental mediation.

Some scholars in environmental communication have pointed directly to the limitations of animation for transmitting environmental messages. Donna Lee King writes:

> ... through its contradictory promotion of both conservation and consumption, and by exposing children to huge complex environmental problems but providing them only with simplistic, individualistic solutions, *Captain Planet* and the liberal environmental ethic provide salve but little substance for avoiding future environmental disaster. (King, 1994: 117)

Sue Grundy (1994: 33), though acknowledging that animation can be beneficial, warns that 'growing-up with programmes that over-simply issues may result in a retardation of

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any attempts to rebalance the environment'. Star A. Muir echoes this, writing that the caricature, visual hyperbole and simplification of animation constitute 'an environmental cartoon ''grammar''' that 'work[s] against a balanced environmental philosophy and rational discourse on critical issues facing society' and threatens culture 'with paralysis and strife over the long run' (Muir, 1993: 22–4). Similarly, while critics in the mass media support environmental animation's efforts to educate children, they condemn its narrative simplifications and individualized moral solutions (Coward, 1990; Kahn, 1991). Young (1992: 27) reports, that by 'uncritically reflecting green propaganda, cartoons . . . are encouraging children to think about these issues ideologically, rather than scientifically or rationally'. Ideologies embedded in animated films are not only 'pro-environment', but serve to reinforce hegemonic conceptions of race and gender. Overall, critiques in both academic literature and mainstream media suggest that epistemologies developed in animation (a 'cartoon grammar') are characterized by simplification and propagandistic forms of ideology that are antithetical to the complex, rational and scientific ways of knowing which will enable audiences to address environmental problems.

This marginalization of animation – both indirectly through a focus on indexical media and directly through overt critique – is based on an assumption that the rhetorical strategies of animation, its tendency to abstract and simplify complex issues and environments, make it less qualified for the representation of environmental conflict. This resistance is not surprising given environmental criticism's long-standing critique of discursive techniques of abstraction that frame complex ecologies as natural resources and reduce them to their profitable characteristics.[2] This marginalization is also based on an assumption that, as Shanahan (1993: 195) articulates, 'the less we mediate our communication about the environment the more we are likely to see it as a real problem . . . awareness must begin from an objectively real basis'. The privileging of news and documentary as the most 'objectively real' media forms, however, is based on what David Ingram (2000: 1–2) identifies as a realist interpretive context whereby 'a film is judged against a particular conception of reality, and is found wanting'. In these critiques of animation, a realist interpretive context enables the framing of animation's simplifications as reducing, distorting and potentially damaging a pre-existing reality. It naturalizes indexical media as the most appropriate mode of representation and reinforces a conception of the environment as objective entity to be captured, rather than subjectively imagined.[3]

Recent research in environmental film studies, counter to this assumption, has examined the significance of environmental messages in mainstream fiction film and television. Here animation is positioned alongside other popular forms that depend on dramatization and is considered a serious transmitter of environmental messages (Brereton, 2005; Cubitt, 2005; Hochman, 1998; Ingram, 2000; Murray and Heumann, 2009). David Ingram (2000) argues that *FernGully*'s and *The Lion King*'s (1994) narrative simplifications are a strength since they facilitate the films' spread to a range of audiences and generate emotional responses that may compel viewers to action. This process is also highlighted by David Whitley (2008: 2), who suggests that even though Disney animation tends to 'simplify problematic issues and to rely on narrative patterns that focus interest on the personality of the characters and the immediate impact of

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actions, rather than more reflective or complex modes of response', the enhanced role of sentiment in these films creates a cultural arena where crucial issues can be explored. Ann Marie Todd argues that the comic frame, the lack of realism and overt hyperbole of *The Simpsons* opens space to address the contradictions of the social system and therefore 'functions as a form of environmental activism' (Todd, 2002: 78). These authors argue that various traits, including sentimentality, popular narrative, detachment from reality and the comic frame, afford new possibilities for environmental representation. These traits, however, are not specific to animation. The studies focus primarily on the films' narrative sequences and overt messages, with less attention to aesthetics or form. Most do not posit any fundamental differences between animation and live action (see also Murphy, 1993). Though these authors begin to address the significance of fictional and non-indexical representation, there is a need for further explication of the specificity of animation in constructing views of the environment.

The politics of animation

Animation studies, a field that theorized the spatial and aesthetic aspects of animated form, offers a critical framework to discern the attributes animation affords to environmental representation.[4] Animation theorists define animation as the practice of endowing characters, environments and objects with *movement* and bringing them to *life* (Cholodenko, 1991; Wells, 1998). As the McLaren quote at the beginning of this article states, animation is not (just) an art of mobilizing existing actors and environments, but is concerned with the drawing of new movements: it is a kinetic art (Halas and Manvell, 1970). For the animator, creating these movements involves seeing between the frames, imaging the invisible and imagining new forms of interaction. Animated works do not seek to replicate reality, but to bring us into imperceptible worlds, including terrains outside of human perception or beyond the camera's reach, such as the inside of the human brain or prehistorical environments (Wells, 1998).

With its ability to contort the space and time of representation, animation can more easily visualize imagined environmental change. Animated films often make the environment mutable and malleable; they produce what Eisenstein calls a condition of plasmaticness (Wells, 1998: 22). Environmental transformation might be depicted as an internally driven metamorphosis (Klein, 2000: 22); or as construction or destruction initiated by a character. Characters' movements and bodies affect and are affected by the environment; the distinction between them can become blurred; subject and object relations can become co-extensive.[5] What constitutes the environment itself is often unfixed or indeterminate. As Halas and Manvell (1962: 8) observe, in 'real life, topography governs all our movements; in the animated world, it is our movements that govern our surroundings'. For example, in *The Man Who Planted Trees* (1987), the drawn lines that compose the characters morph into built structures, into objects and into the landscape. This representation of environmental transformation as a visual phenomenon and the blurring of subject–object relations constitute what I term *environmental mutability*.

If *environmental mutability* describes an aesthetic of environmental transformation, *environmental interaction* describes the representation of the world, not as a backdrop for character interaction, but as a dynamic force one can interact with; in the terms of

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animation theorists, as an actor brought to *life*. Environmental interaction refers both to functional interaction, defined as physical interaction with an object or text, and cognitive interaction, a mode of perception requiring a high level of interpretative response (Zimmerman, 2004: 158). The environment in environmental animation is often made interactive for characters that can manipulate and be manipulated by their worlds in seemingly impossible ways. Suzanne Buchan argues that this engaged relationship created between characters and world often transcends to the spectator – since spectators must hypothesize about the rules and operations of the animated world, it is made 'interactive' for them (Buchan, 2007). The pleasures of animated texts frequently come from identifying with characters' kinetic environmental interactions. Environmental interaction therefore describes the strategy of making the environment functionally interactive for animated characters, and perhaps more importantly, eliciting a high degree of cognitive interaction from the spectator as their interpretive attention is directed toward the environment as a possible actor.

The portrayal of the environment as mutable and as interactive can alert us to its cultural construction as a landscape rather than as an objectively existing nature. Through exaggerated environmental transformation and the deliberate misrepresentation of reality, animation can lead audiences to question how the actual world has been constructed. Aylish Wood (2006) argues that the revelation of environments in the process of transformation can orient us to their possibilities as artificially created spaces, and as constructs that we might be able to manipulate. For example, *What on Earth*! portrays cars as Earth-lings, visualizing them in ways that draws parallels to bugs, humans and other life forms, and creates new conceptual frames for the viewer's perception of reality. After viewing the film, we might see actual cars differently. This process has been critical to animation; as Paul Wells (1998: 11) states, 'Animation intrinsically interrogates the phenomena it represents and offers new and alternative perspectives and knowledge to its audience.' The use of environmental mutability is only one of the tactics through which animation can prompt a viewer's critical recognition of the *environment as construct.*

These are three ways in which animation's experimental and imaginative views can challenge our environmental imagination. While these strategies are possible (though difficult) to achieve in live action film, they have been more extensively developed in animation. In the remainder of this article, I document the historical evolution of these representational practices. To do so, I first identify three historical periods in which there was enough momentum in mainstream environmental media production to stimulate significant investment in animation (particularly in its distribution to a mass audience) and in which representational practices coalesced. This breakdown is not intended as a rigid categorization of all environmental animation; apart from these waves, auteur animators, including Frédéric Back in Canada, Hayao Miyazaki in Japan and Faith and John Hubley in the US, have incorporated environmental themes and the above strategies throughout their work.[6] I then select a series of films and television shows from each wave that were widely recognized by both animators and the public as environmental animation, and therefore had a more extensive aesthetic impact. Using textual analysis, I link features of these works to a dominant set of aesthetic and narrative patterns in each period. I demonstrate the ways that environmental mutability, environmental interaction and

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environment as construct have transformed in each period. This analysis suggests that even though diverse modes of representation are possible in animated worlds, the ones that have materialized have in part been conditioned by their historical context.

First wave: Creating mutable environments

Ecologically themed animation can be traced at least as far back as *Bambi* (1942) and to cartoon figures such as Smokey the Bear. It was not until the late 1960s, however, that environmental themes in animated film became explicitly and consciously aligned with mainstream environmentalist discourses, and environmental animation coalesced as an identifiable genre. In Canada, the first sustained cycle of films included *What on Earth*! (1966), *Boomsville* (1968), *Citizen Harold* (1971) and *Deep Threat* (1977), all shorts produced by the National Film Board that critique rampant industrialization. In the US, *The Bear That Wasn't* (1967), *Yogi's Ark Lark* (1972) and *The Lorax* (1972) also address the industrialization and the pollution of modern society. *Sealab 2020* (1972) was a television show about an underwater research station whose inhabitants regularly faced environmental threats. These films and television shows pit animals, young children and pristine nature against caricatured environmental villains and capitalist development.

While these films were produced in different national contexts using varied techniques, common features emerge across the texts. The implied viewer is educated less about the facts of nature than about how anthropomorphic figures relate to material contexts. These contexts are not static, but are coordinated with the movements of actors. In *The Lorax*, in which a greedy Once-ler exploits the forest, the movements of colorful, textured truffula trees mirror those of the creatures in the world, and their outrageous shapes resemble the outrageous shapes of the buildings. In *What on Earth*!, a swarming mass of colorful cars resemble crawling bugs; when they are blocked by a hill, it is promptly cleared by bulldozers for them. They morph into black dots sliding along roller coasters, then into a mess of dotted pipes. In both of these films, the landscape transforms and mutates. This mutability translates to cognitive interactivity for the spectator, who first must guess the rules of this environment as it takes on a life of its own and then must make imaginative leaps to understand its dismantling and recreation. In *What on Earth*! this process is paired with narration that encourages one to view the environment as a construct. While showing the car's 'breeding centers', the narrator announces 'although [breeding] is shrouded in secrecy, our scientists believe that it must go something like this', and calls attention to the fantastic imagining involved in the world's creation. The film gives us a set of new frames for viewing our environment as constructed: car production becomes breeding, gas becomes food and billboards become libraries.

Deep Threat also portrays a mutable environment, but does so through collapsing time rather than morphing space. The film opens with an image of a red planet, onto which suddenly drops a blob of blue and green color; the earth is constructed in a few seconds. The film quickly runs through evolution: humans are created, construction cranes, bulldozers and machines appear, and finally a huge wasteland takes over. This compresses millions of years into a minute; environmental transformation becomes an instant process and environmental destruction could occur in any moment. In *The Bear*

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That Wasn't, a similar collapsing of time takes place as a bear wakes up from his cave to find an entire city built over the forest. Humans mistake the bear for a man dressed in a bear suit; he is transformed into a worker. The social and spatial parameters of this world become indefinite: space (literally, the corporate office tower) continues to expand outward and upward for the bear, even when we think it has reached its limits. The visual display of the accelerating drive of the capitalist system is comic. It threatens to dissolve the environment and replace it with a new one, dissolve nature and turn it into culture; yet as we watch it, it becomes clear that this process has already taken place and there is no stable end in sight. As in the other films of this era, the environment is represented as an interactive space with a life of its own, and it stimulates our reflection on the actual world as a construct we have had a role in producing. Environmentalist movements in these narrative worlds must acknowledge and participate in the environment's continued transformation.

Together these films develop a set of strategies for the representation of the environment: it is elastic and mutable; it appears to have life and agency; and it seems to be a construct open to manipulation and interpretation both by characters and spectators. The pleasures of these texts are a product of our ability to cognitively dismantle lived time and space, to see cars, trees, highways, machines and mountains as forms of life and as inter-actors. While this enables diverse perceptions of environmental change, a recurring problem in first wave films is that the environmentalist subject (in the cases above, humans and bears) is not allotted agency in the transformation of space: there is no narrative trajectory by which they can change their environment for the better. Though the environment is portrayed as mutable and interactive, the characters that are able to engage it are environmental villains: builders, polluters, and evil capitalists. First wave films are also difficult to align with environmental movements since they are not anchored in specific places. *The Bear That Wasn't* could have occurred in any city, *The Lorax* occurs in a fictional space, *Sealab 2020* could happen in any part of the ocean. The narratives of these early films advance a unilateral critique of techno-scientific progress and Enlightenment rationality, mourning the loss of a pure 'nature'. Setting up simplistic binaries between environment and technology, they tend to promote simple and universal solutions (e.g. get rid of the city). Though these films engage us in seeing the world as a construct, their messages contradict this, suggesting that we must save a nature that is still pristine and pure.

Second wave: Expanding environmental interaction in the feature film

The second wave of environmental animation emerged in the late 1980s and continued through the early 1990s. There was a rise in production of short films as well as a drastic increase in the number of environmentally themed television shows and feature films. In Canada, the adoption of environmental issues emerged in mainstream media in the made for TV movie *The Christmas Raccoons* (1980), featuring a family of raccoons whose forest home is threatened, and the subsequent series, *The Raccoons* (1985–91), which addressed environmental issues in a number of episodes. In 1988 a short-lived Canadian television show, *The Smoggies*, focused on conflicts between a group of fun-loving

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Suntots and the polluting Smoggies. In the US, the television shows *Captain Planet and the Planeteers*, *Widget, the World Watcher* (1990–4) and *Toxic Crusaders* (1991–3) all featured heroes fighting environmental villains. Many regular animated television shows such as *The Simpsons* began to pick up environmental issues for episodes. Other films of the period include *Dreaming of Paradise* (1987), *Ana in the Rainforest* (1991), *The White Hole* (1991), *The Mighty River* (1993) and *Revenge of the Trees* (1993). The most significant shift in this era was the emergence of mainstream environmental feature films in the US. These required millions of dollars in capital investment, a labor force of hundreds and developments in advanced technology (this is also the period when digital technologies are beginning to be used). The films, which range from ecologically themed animation to having a strong environmentalist message, include *The Land Before Time* (1988), where dinosaurs migrate from a barren landscape to the lush Great Valley; *The Rescuers Down Under*, in which a crew of mice rescue a young boy from an evil poacher; *FernGully: The Last Rainforest*; *Once Upon a Forest*, where forest animals rescue their friend from toxic poisoning; *The Lion King*, in which Simba restores the balance of nature after resources have been depleted; and *Pocahontas* (1995). Like the first wave films, many of these critique development and sound a call to preserve nature.

FernGully: The Last Rainforest, *The Rescuers Down Under* and *Once Upon a Forest,* as the most overtly environmentalist of the feature films, break from first wave animation in both content and style. The aesthetic strategy of Disney realism comes to dominate. Environmental heroes are anthropomorphized to a greater degree and the animated world more closely mirrors the actual world: the narratives are firmly located in the Australian rainforest, the Australian outback and an English forest, respectively. This series of global (rather than universal) environments are drawn meticulously based on the actual locations. Animators often conducted site visits to ensure accuracy. While first wave films align their conflicts on a binary axis, where those who care about the environment confront caricatured environmental villains, films of the second wave model environmental negotiation (and the resolution of environmental conflict) after contemporary inter-racial and international negotiations. In *FernGully*, a white man, Zak, travels into the rainforest, falls in love with a native female, learns of the destruction that his logging has caused and returns to enlighten others. The underlying message is an isolationist one: humans (aligned here with the urbanized First World) should leave fairies and the rainforest alone. In *The Rescuers Down Under*, a coalition of white mice based in New York (a global rescue team modeled after the UN) sends delegates to save a young boy in the Australian outback; when they arrive, they are oriented by the 'native' outback animals. These animals depend on outside help: despite their extensive local knowledge they are unable to do anything to save their own environment. In *Once Upon a Forest*, the young forest animals are constantly bickering and cannot get along. It is only after numerous encounters with segregated and racially differentiated animal groups that they are able to come together and save their friend from toxic poisoning. In this film, we hear a message to just get over our differences and accept authority (opposed to those in other regions who don't have the capacity to cooperate). In each of these films, environmental knowledge is gained by making connections across differences and borders. While first wave films reaffirmed these differences by positioning the environment and capital as incompatible, later films stress the agency on both sides and

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present a compromised outcome. Unfortunately, the formal techniques of animation are used to position, through the most conventional of stereotypes, national and racial difference as an absolute and naturalized species difference. This strategy, though often seen as a reduction of the 'reality' of global relations, constitutes a movement in environmental animation towards real world scenarios.

These films also represent and engage a wide variety of contemporary technologies. While the exaggerated bulldozer surfaces in each of these films, before this period, this icon coincided with an anti-technology position. In *FernGully*, it is not the simply the bulldozers that threaten FernGully, but Hexxus, an evil toxic spirit fueled by forces of consumption. Advanced technologies also prove useful in the film. Music generated from a giant cassette player brings together humans and fairies in song and dance. Batty, an intermediary character, channels messages both from and critical of humans through an antennae on his head: the mediation of human and the fairy culture is facilitated by wireless technologies. In *The Rescuers Down Under* mice also use wireless transmission to help secure a rescue team; they co-opt humans' radio towers in order to wire subversive transmissions. Multiple times in *Once Upon a Forest* conflict is resolved by the young animals' mastering of technology. While these are problematic uses of technology in that they can only be manipulated by one species (naturalizing hierarchies of social and political power), there is a shift in attention to examining *how* technologies are used rather than criticizing them in themselves. Many of these uses are actually 're-uses'; characters manipulate and divert established systems towards new ends (a personal headset transformed into a public stereo, a system of mental control changed to transmit destabilizing messages, a military apparatus reused for philanthropic purposes). This representation of subjects enabled by technology generates questions about environmental governance, rather than adhering to an unconditional critique of technology.

With the shift to Disney realism, characters no longer quickly mesh with their environments, nor do they completely transform it in moments. The environment is represented as mutable far less often. These films, however, do not leave behind earlier strategies of depicting impossible and imaginative *interactions* with the environment; the main characters (rather than just the villains) are granted agency in this process. The impossible reappropriations of technologies mentioned above are just one instance of this strategy. In *FernGully*, these interactions are explained in terms of the environment's 'magic': Crysta is able to make a seed grow into a towering tree by pressing a seed in her hand; the generation of life is represented as a dynamic visual phenomenon. The film later culminates when Zak, with Crysta's help, also uses the forest's magic to make a seed grow. In one scene, Crysta tells Zak to listen to the rainforest since it is trying to tell them something. In another, the characters are able to leap along the surface of pools of water. Throughout the film, the fairies fly through the rainforest at impossible speeds, navigating its intricacies. While only some of these techniques visually depict the environment as mutable, all frame the environment as something the characters interact with: it can be grown, felt, listened to, and it acts on its own terms. In *The Rescuers Down Under* the characters also transcend the environment's limitations: a young boy scales a huge cliff, falls off it (but never gets hurt), and is rescued by a golden eagle who brings him close enough to the river for him surf on top of it. The animals of *Once Upon a Forest* are able to build a plane from scratch out of forest materials. In these

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moments, for characters and for viewers who identify with them, the limitations of the 'real' can be transcended and one can perceive the landscape as something that is navigable, inhabitable and interactive.

The second wave of environmental animation, crystallized in *FernGully*, *The Rescuers Down Under* and *Once Upon a Forest*, thus utilizes the play possible in animated worlds to point to the importance of environmental interaction. In moving towards realism, moments of environmental mutability occur far less often. There is no longer a sustained reflection on the environment as a construct. These films' transition away from the parable-like structure and placelessness of the first wave in part enabled them, especially *FernGully*, to move into new discursive and institutional contexts where they were considered as a serious contribution to environmental communication. It is this compromise, between enhanced narrative and aesthetic realism and imaginative moments of environmental interaction, that facilitated these films' incorporation within mainstream environmentalist discourse and salience for organizations such as the United Nations; here animation became a means of speaking across national and political boundaries to a global audience.

Third wave: Revealing the environment as a visual construct

The third wave of environmental animation is not as overtly environmentalist in its messages as the films from the early 1990s. Feature animation in this cycle includes *Ice Age: The Meltdown* (2006), *Happy Feet* (2006), *Over the Hedge* (2006), *The Simpsons Movie* (2007) and *Avatar* (2009), even though it is part live action. It might also include ecologically themed films such as *Chicken Run* (2000), *Open Season* (2006) and *Fantastic Mr. Fox* (2009), in which farmers and hunters serve as antagonists. This period evidences a general movement from the forest as the setting to the poles; this parallels a broader transition from logging to climate change in global environmental discourse. Most use computer-generated imagery (CGI) and are increasingly photorealistic. While none present the degree of environmental mutability of first wave films, many still evidence moments in which the environment is represented as elastic, indeterminate, or in the process of transformation. At the start of *The Simpsons Movie*, Homer Simpson gets rid of a silo of pig excrement by dumping it into a lake. In seconds, dark bubbles boil up, radiate outward and rapidly transform the environment into a toxic site, recalling the imagery of Hexxus in *FernGully*. The interaction between characters and environment often mirrors the mobilities afforded by video games. In *Over the Hedge* characters overcome a range of obstacles and perform impossible physical feats in service of collecting junk food. In *Happy Feet*, penguins slide with incredible agility and speed across the icy Antarctic playground. As in the earlier films, the characters' mobilities provide them with an array of interactive possibilities with the environment. Unlike second wave films, however, these interactions do not often result in overt environmental transformation and are not put in service of environmentalist ends.

There is a shift in this cycle of environmental animation towards incorporating visual imagery in environmental interaction. While in the first wave environmental mutability encouraged viewers to see the environment as constructed, here, the visual play between the 'real' environment and the imagined one prompts a recognition of the image's role in

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constructing the environment. In *The Simpsons Movie*, the Simpsons are driving to Alaska after having polluted their hometown; out the window they see the Alaska Pipeline and oil fields. Homer says, 'this isn't what Alaska looks like', takes out the state's publicity poster, and plasters it to the inside of the windshield, substituting a pristine landscape for the exploited one. Not being able to see through the windshield, they careen off the road. When they are reoriented, the view out the front window has indeed transformed into the one on the publicity poster. Homer claws at it to remove it until he realizes that it is real. In this scene, the environment quickly and drastically changes to match the images the Simpsons have projected of it; environmental transformation is effected through the manipulation of these images rather than through machines.

A similar twist occurs in *Happy Feet*, though with much less irony. The film, which goes without any environmentalist content through its first half, takes a turn when Mumble, the penguin hero, is captured and placed in a zoo. He wakes up to see a drawn Antarctic landscape unfolding out before him. Walking towards it, however, he realizes that it is only the wall of the zoo. While *The Simpsons* transforms the image of a pristine environment into the real world, in *Happy Feet* Mumble sees the world transformed and reduced to an image that he cannot enter. At the end of the film, when Mumble is returned to Antarctica, he leads his penguin colony in dance for the humans who are videotaping them. Their visual display is broadcast worldwide and leads to a moratorium on fishing. The penguins are saved only because of the rapid transformation of global *view* of the Antarctic landscape. These films each utilize animation's ability to seamlessly layer representational worlds in order to stimulate reflection on the role of the image in environmental transformation. Mainstream environmental media's representation of this process coincides with a movement to the widespread dissemination of environmental media on the internet and an increased consciousness of images as agents of environmental change.[7]

The end of the decade saw the release of *Avatar*, which shifted away from reflection on visual transformation back to the immersive forest environments of *FernGully*. While this is not an entirely animated film, it relies heavily on CGI, especially for its rainforest scenes. As with many of the films discussed above, viewers were quick to point out *Avatar*'s narrative and ideological shortcomings, including its similarities to other films, such as *Dances With Wolves*, *Pocahontas*, *The Lorax* and *FernGully*, as well as its racist, sexist and simplistic narrative. *Avatar* and *FernGully* have much in common aside from their narratives. Both films stood on the cutting edge of visual effects. *FernGully* was one of the first to use computer animation and *Avatar* pushed forward 3D CGI to new limits. Both used the rainforest as their testing ground for constructing elaborate interactive environments; this is perhaps because, as Bachelard writes, 'the experience of immensity may be particularly associated with the forest, where we so easily lose a sense of direction and a precise spatial orientation' (Bachelard cited in Whitley, 2008: 108). For *Avatar*, like *FernGully*, the most compelling part of the film is the expansive CGI landscape that emerges from the screen; the construction of this landscape has been the focus of much discussion about the film. The environment becomes interactive in *Avatar* not only through the imaginative interactions characters have with it (the dizzying navigation of the rainforest's intricacies especially recalls the movements of *FernGully*), but in the fact that the forest is actually a network to which one can upload and download memories, images, histories. The animals can interconnect via animated tendrils to the

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forest people. As an inter-actor, the environment itself has agency and intervenes in the film's final battle sequence. *Avatar* explicitly narrates what is implicit in the films above: the environment is an interactive system brought to life only through animation.

In the digital era, another axis also comes into play: these films are trans-mediated across video game consoles and online environments so that viewers can increasingly interact with animated worlds outside the films. This includes the *Avatar* video game, which channels interactions with the filmic environment into a user's physical interaction with the game environment and controller. Similarly, in the many *Avatar*/*FernGully* mash-ups, ranging from 'Avatar: The Last Rain Forest' to 'James Cameron's Thundersmurfs – The Return to Ferngully', fans have used the similarities between the films' narratives and environments to edit them together. Cross-cutting between these films is enabled by their shared blue-green fluorescent environmental hues, the movement through a multilayered forest, and the depth and reach of these landscapes. These mash-ups, along with the extensive discussions about the production of the CGI landscape, testify to viewers' engagement of the environment as a visual construct, though the degree to which this is a critical engagement is limited. Nonetheless, situating *Avatar* in the context of the history of environmental animation suggests that the film's potential for environmental communication lies less in its derivative plot-line and save the rainforest message than in its innovative portrayal of the environment as elastic and interactive.

Conclusion

Alongside the third wave of environmental animation, there have been drastic changes in the media environment, including an increasing availability of animation programs, the blurring of distinctions between producers and consumers and a move to distribution platforms based on social networks. This contemporary shift provides a moment to reimagine what environmentalist media might look like. For example, many amateur animators have been able to produce media about imperceptible global issues without financial or social capital. Since their creative practice invites a shifting of visual registers (seeing the environment in terms of the material it offers, as a landscape to be represented and as a constructed image), it might be productive to consider how each of these modes of engagement (mutability, interaction and environment as construct) functions for the filmmakers themselves. Future research could also examine how the creation of environments encourages a dismantling of lived time and space for animators who must think about how to draw movements rather than how to capture them. Despite the proliferation of these works and the successes of *FernGully* and *Avatar*, environmental animation is still not considered a serious transmitter of environmental knowledge by the mainstream media, who continue to criticize these works for their 'reduction' of environmental issues, simplistic narratives and failure to look at tangible solutions.

This article builds on research in environmental media studies that has begun to address the impact of animated works (Brereton, 2005; Cubitt, 2005; Hochman, 1998; Ingram, 2000; Murray and Heumann, 2009). It engages texts in animation studies (Cholodenko, 1991; Halas and Manvell, 1970; Wells, 1998) to suggest the specific affordances animation offers for environmental representation. To summarize, animation enables the visualization of the environment as mutable; it can endow the environment

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with life and figure it as a possible inter-actor; and it can use these formal strategies to prompt viewers to reflect on the environment as a construct. Tracing each of these attributes over the history of environmental animation reveals the ways in which they have transformed during each period. A first wave of environmental animation pioneered the representation of the mutable environment, imaging these spaces in transformation and developing the representation of environmental interaction and environment as construct. The second wave, influenced by a shift in environmental discourse in the 1990s, balanced a realist aesthetic with imaginative representations framing the world as interactive. The representation of environmental mutability was limited to shorter portions of the text and there was less reflection on the environment as a construct. In the third wave, a reflection on the role of images in the transformation of the environment emerged, coinciding with the proliferation of environmental media on the internet. *Avatar* breaks from this wave in many respects, as it more closely resembles *FernGully* than the other films of the third period. It remains to be seen what direction environmental animation takes in the future.

This analysis demonstrates that the attributes animation affords for environmental communication stretch beyond its transmission of narrative and political ideology to the imaginative views it offers of the environment itself. The indeterminacy produced by animated images, the modes of interactivity they elicit and the questioning they can initiate about the constructed nature of the environment are representational features valuable in our current political climate. In these films, environments are drawn, rather than captured; they transform, rather than staying still. While the representation of environmental mutability decreased in the move to feature films and realist aesthetics, animation's potential for visualizing imperceptible environments and environmental processes has been mobilized throughout. Instead of concentrating solely on media forms that excel in the mobilization of clear-cut messages and images of environmental danger, we might look to animation as a practice that occurs at the interstices between different framings of the environment, a speculative form that asks us first to imagine and then to draw environmental movements.

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Appendix 1: Partial list of environmental and ecologically themed animation

Avatar (2009)
Fantastic Mr. Fox (2009)
The Simpsons Movie (2007)
Open Season (2006)
Over the Hedge (2006)
Happy Feet (2006)
Ice Age: The Meltdown (2006)
Good Riddance! (2004)
Spirit: Stallion of the Cimarron (2002)

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Spirited Away (2001)
Earth Girl Arjuna (2001)
Chicken Run (2000)
Meet Bakkar (1999)
The Common Sense of the Wisdom Tree (1999)
FernGully II: The Magical Rescue (1998)
Bunch of Fives (1998)
Under the Weather/A`l'ombre (1997)
Princess Mononoke (1997)
The Sandbox (1996)
Pocahontas (1995)
The Lion King (1994)
Pom Poko (1994)
Once Upon a Forest (1993)
The Mighty River (1993)
Revenge of the Trees (1993)
Green Animation: Cartoons to Save the World (1993)
FernGully: The Last Rainforest (1992)
Ana in the Rainforest (1991)
The White Hole (1991)
Toxic Crusaders (1991–3)
Widget, the World Watcher (1990–4)
Captain Planet and the Planeteers (1990–3)
The Rescuers Down Under (1990)
The Smoggies (1988)
The Land Before Time (1988)
My Neighbor Totoro (1988)
Dreaming of Paradise (1987)
The Man Who Planted Trees (1987)
Castle in the Sky (1986)
The Raccoons (1985–91)
Nausicaa¨ of the Valley of the Wind (1984)
The Christmas Raccoons (1980)
Future Boy Conan (1978)
Deep Threat/Mer mère (1977)
Second Chance: Sea (1976)
Voyage to Next (1974)
Sealab 2020 (1972)
The Lorax (1972)
Yogi's Ark Lark (1972)
Citizen Harold (1971)
Boomsville (1968)
The Bear That Wasn't (1967)
What on Earth! (1966)
Bambi (1942)

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Notes

1. I propose that environmental animation and ecologically themed animation exist on a continuum. Whereas *Bambi* (1942) occupies one end of the spectrum, as it could be read as anti-hunting and therefore aligned with environmentalist aims, *Chicken Run* (2000) moves closer to environmental animation, as the central narrative struggle throughout the film is against farming. *FernGully: The Last Rainforest*, at the other end of the spectrum, directly points our attention to environments and environmental issues. The degree to which these films and television shows construct a knowledge of environmentalism constitutes a possible area for further research.
2. This criticism, though leveraged at a range of more subjective forms, is especially applicable to animation, which has been discussed as a 'thoroughly technologized medium' (Cubitt, 2005: 32).
3. This critique also ignores the many practices of environmental education that rely on strategies of abstraction and reduction in order to translate intricate systems and processes (often developed by a small group of people) from one context to another.
4. Whereas the above approaches are also split, with environmental communication texts primarily treating television and environmental film studies treating film, scholars in animation studies have long looked at film and television animation together – these industries are connected in terms of their labor, their aesthetic practices and animation technologies.
5. It can also blur the relationships between characters; as Sean Cubitt (2005: 37) argues, animation 'might then be characterized as the process of visualizing the visible in such a way that it becomes a conduit for invisible relations between phyla'.
6. Japanese anime follows a different logic and has a different aesthetic history from US and Canadian animation; for this reason Japanese animation is not included in this periodization.
7. The features of environmental mutability and the revelation of the environment as a construct are still critical to many shorter works of this period, which can be as widely disseminated as feature films. See for example, *The Meatrix* (2003), a spoof of *The Matrix*.

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